Massachusetts Institute of Technology
Instrumentation Laboratory
Cambridge, Massachusetts

DANCE Memo #69, COLOSSUS Memo #52, LUMINARY Memo #24

TO: Distribution

FROM: C.W. Braunhardt

DATE: April 24, 1968

SUBJECT: Standards For Verification Plans

The time required for publication of Level 3 verification plans can be reduced by at least 25% if each programmer will follow the guidelines indicated in this memo. Padded verification plan forms are available from your supervisor.

Conciseness and completeness should be of prime importance. The plan should be expressed in general (but not vague) terms, since tying the test programmer to a specific set of values may well tend to defeat our purpose; the programmer must be able to retain a flexibility within the limits of the GSOP.

Submit for publication only those test plans that are beyond the rough draft stage so that duplication of the keypunching effort may be avoided.

Each test plan consists of a test number and title, and four paragraphs: Objective, Initialization, Sequence, and Criteria. Notice that each line in the test plan is left-justified. Omit punctuation other than commas and colons, and omit periods since each new sentence begins at the left margin. The remaining section, Astronaut Cards, is used in an administrative capacity and is not keypunched.

OBJECTIVE briefly describes the purpose of the test. Begin with the word "Demonstrate", (not "To demonstrate" or "Verify".

INITIALIZATION includes all initial conditions as stated in Section IV of the GSOP.

SEQUENCE outlines the steps to be followed according to Section IV of the GSOP. Write out each step; astronaut card descriptions such as "IF V16N45 THEN WAIT 2 V32E" are not acceptable within the sequence, but the sequence should be sufficiently clear to show the GSOP flow.

CRITERIA describes the standards to be used to verify the results. Depending on the objective, the standard may be a MAC comparison, an environment edit, or just that the expected displays do appear. The type of standard depends on whether the run is an accuracy check or a flow check.

The section labeled ASTRONAUT CARDS is used in GSOP checking, and should contain a list of these cards as they appear in your test program.

Paragraphs which require the same procedures as those in previous tests within the same program may be written "Same as PXX.X". If an entire test is the same as a previous test but with some exceptions it may be written "Same as PXX.X except (state the difference)".

P23.15 NOMINAL SEQUENCE OF TRACKING,
MARK DATA PROCESSING,
AND UPDATING THE CMC STATE VECTOR

OBJECTIVE

NOMINAL TRANS-EARTH TRAJECTORY, COORDINATE CENTER IS MOON
ASTRONAUT WILL SIGHT ON EARTH NEAR HORIZON AND STAR
Demonstrate the ABILITY TO COMPLETELY MANUALLY MANEUVER VEHICLE AND OPTIC TO TAKE MARK
Demonstrate the UPDATING OF CMC STATE VECTOR

INITIALIZATION

IMU IS OFF
AN ERROR WILL BE PUT IN THE STATE VECTOR IN THE CMC

SEQUENCE

SELECT P23 FROM P00
REFSMFLG IS RESET
PERFORM THE OPTICS CALIBRATION ROUTINE R57, RETURNING ZERO BIAS
TAKE MARK VIA R53
AT FLASHING V05 N71 LOAD STAR NUMBER 27 AND HORIZON 00110,
THEN PROCEED
COMPUTE DELTA R AND DELTA V AND DISPLAY THEM VIA V06 N49
SELECT PROCEED AND GO TO P00

CRITERIA

COMPARISON WITH MAC RESULTS
ANALYSIS OF ENVIRONMENT EDIT

ASTRONAUT CARDS

WAIT 3500 OPTMODE ZERO ENCODERS
WAIT 1 V 48 E
IF V 04 N 46 THEN V 24 E 11003 E 11111 E
IF V 04 N 46 THEN V 33 E
IF V 06 N 47 THEN V 21 E +34000 E
IF V 06 N 47 THEN V 33 E
IF V 06 N 48 THEN WAIT 2 V 24 E -00194 E +00124 E
IF V 06 N 48 THEN V 33 E
WAIT 1 V 46 E WAIT 1 V 37 E 23 E
WAIT 1 CSMRATE 3 WAIT 1 SUBPROGRAM 83 EARTH=1 LANDMNO=1
LAT=0 LONG=0 ALT=0 STARNP=27 HOLD CARDS
WAIT 1 OPTMODE MANUAL

```
IF V 59 THEN V 33 E
WAIT 1 SCSMODE FREE WAIT 1 SUBPROGRAM 84 AUTOS =0 EARTH=1 LANDMNO=1
LAT=0 LONG=0 ALT=0 STARNO=27 HOLD CARDS
IF V 01 N 71 THEN WAIT 1 V 33 E
IF V 05 N 71 THEN V 25 E 00033 E 00000 E 00110 E
IF V 05 N 71 THEN WAIT 1 V 33 E
IF V 06 N 49, THEN WAIT 6 V 33 E
```